Appl. No. 09/452,285
Amdt. dated: January 6, 2004
Reply to Office Action of October 6, 2003

Docket No. CISCO-1515
(032590-000083)

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings of claims in the

application:

LISTING OF CLAIMS

1. (Currently Amended)   A backup server for enabling a data communications

network to recover from a local server failure, the data communications network

including a network access server (NAS) for coupling a call placed from a call-in user to

the data communications network, the NAS having a memory associated therewith, said

backup server comprising:

an information packet receiver ~~requester~~ responsive to the local server failure, the

information packet receiver ~~requester requesting and~~ receiving from the memory

associated with the NAS an information packet associated with an ongoing call placed by

the call-in user via the NAS, the information packet containing call information for

maintaining connection of the ongoing call if the local server fails; and

a parser for reconstructing the call information from the information packet, such

that the backup server maintains the ongoing call to the data communications network.

2. (Previously Presented)   A backup server according to claim 1, wherein the call

information comprises server-state attribute (SSA) having an attribute/value pair that can

be parsed into a plurality of separate data entries.

Appl. No. 09/452,285
Amdt. dated: January 6, 2004
Reply to Office Action of October 6, 2003

Docket No. CISCO-1515
(032590-000083)

3. (Previously Presented)   A backup server according to claim 1, wherein the

information packet further comprises a plurality of aggregated data elements from a call

attribute table.

4. (Previously Presented)   A backup server according to claim 3, wherein the plurality

of aggregated data elements are separated by said parser for reconstructing the call

information from the information packet.

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5-8. (Canceled)

9. (Currently Amended)   A local server for enabling a data communications network

to recover from a failure of said local sever, the data communications network including

a backup server and a network access server (NAS), the NAS coupling a call placed from

a call-in user to the data communications network, the NAS having a memory associated

therewith, said local server comprising:

an encoder for generating an information packet associated with an ongoing call

placed by the call-in user via the NAS, the information packet containing call information

for maintaining connection of the ongoing call if the local server fails; and

a sender for transmitting the information packet from the encoder to the memory

associated with the NAS, the information packet being stored in the memory to be

available to the backup server if the local server fails.

Appl. No. 09/452,285
Amdt. dated: January 6, 2004
Reply to Office Action of October 6, 2003

Docket No. CISCO-1515
(032590-000083)

10. (Previously Presented)   A local server according to claim 9, wherein the call

information comprises server-state attribute (SSA) having an attribute/value pair that can

be parsed into a plurality of separate data entries.

11. (Previously Presented)   A local server according to claim 9, wherein the

information packet further comprises a plurality of aggregated data elements from a call

attribute table.

12. (Previously Presented)   A local server according to claim 11, wherein the plurality

of aggregated data elements are separated by said parser for reconstructing the call

information from the information packet.

13. (Currently Amended)   A system for maintaining a call placed by a call-in user to a

data communications network, the network including a network access server (NAS) for

coupling the call to the network, a local server servicing the call, a backup server, and a

failure detector for detecting a failure of the local server, the system comprising:

a memory associated to the NAS;

an encoder associated with the local server for generating an information packet

associated with an ongoing call placed by the call-in user via the NAS, wherein the

information packet containing call information for maintaining connection of the ongoing

call if the local server fails;

a sender for transmitting the information packet from said encoder to said

memory associated with the NAS, the information packet being stored in said memory;

Appl. No. 09/452,285
Amdt. dated: January 6, 2004
Reply to Office Action of October 6, 2003

Docket No. CISCO-1515
(032590-000083)

a call coupler associated with the NAS for coupling the call to the local server if

the local server does not fail, and for coupling the call to the backup server if the local

server fails;

an information packet forwarder for transmitting the information packet from said

associated memory to the backup server if the local server fails; and

a parser associated with the backup server for reconstructing the call information

from the information packet such that the backup server can recover the call information

and serve the call without disconnecting the user from the network.

14. (Currently Amended)   A system according to claim 13, wherein said information

packet forwarder comprises:

an information packet requester associated with the backup server for requesting

the information packet from said memory associated with the NAS in response to the call

received from the NAS, if the call information is not available to the backup server.

15. (Previously Presented)   A system according to claim 14, wherein said information

packet requester requests the information packet from said memory if the call information

is not available to the backup server.

16. (Previously Presented)   A system according to claim 14, wherein said information

packet forwarder further comprises:

an information packet sender associated with the NAS, for transmitting the

information packet in response to a request from said information packet requester.

Appl. No. 09/452,285
Amdt. dated: January 6, 2004
Reply to Office Action of October 6, 2003

Docket No. CISCO-1515
(032590-000083)

17. (Currently Amended)   A network access server (NAS) for maintaining a call

placed from a call-in user to a data communications network, the data communications

network including a local server for servicing the call, and a backup server capable of

servicing the call, said NAS comprising:

a receiver for receiving an information packet from the local server, the

information packet <u>associated with an ongoing call placed to the NAS by the call-in user,</u>

<u>the information packet</u> containing context data of <u>the</u> ~~an~~ ongoing call ~~information~~ for

maintaining connection of the <u>ongoing</u> call<u>;</u>

an associated memory for storing the information packet;

a failure detector for determining if a failure of the local server has occurred; and

a sender for transmitting the information packet from the associated memory to

the backup server if the local server failure has occurred.

18. (Previously Presented)   A NAS according to claim 17, wherein the call information

comprises server-state attribute (SSA) data having an attribute/value pair that can be

parsed into a plurality of separate data entries.

19. (Previously Presented)   A NAS according to claim 17, wherein the information

packet further comprises a plurality of aggregated data elements from a call attribute

table.

20. (Currently Amended)   A server backup system for maintaining an ongoing call

placed by a call-in user to a network, the network including a server servicing the call, a

Appl. No. 09/452,285
Amdt. dated: January 6, 2004
Reply to Office Action of October 6, 2003

Docket No. CISCO-1515
(032590-000083)

network access server (NAS) coupling the call from the user to the server, and a memory

associated with the NAS, said system comprising:

a backup server connected to the network, said backup server being capable of

servicing the call;

an encoder associated with the server, said encoder generating an information

packet associated with an ongoing call placed by the call-in user via the NAS, the

information packet containing call information for maintaining connection of the ongoing

call;

a sender associated with the server, said sender transmitting the information

packet to the memory associated with the NAS, the memory storing the information

packet;

a call coupler associated with the NAS, said call coupler rolling over the call to

said backup server if the server fails;

an information packet requester associated with said backup server, for requesting

the information packet from the memory associated with the NAS in response to the call

received from the NAS, if the call information is not available to the backup server; and

a parser associated with said backup server, for reconstructing the call information

from the information packet.

21. (Previously Presented)   A server backup system according to claim 20, wherein the

call information comprises server-state attribute data having an attribute/value pair that

can be parsed into a plurality of separate data entries.

Appl. No. 09/452,285
Amdt. dated: January 6, 2004
Reply to Office Action of October 6, 2003

Docket No. CISCO-1515
(032590-000083)

22. (Previously Presented)   A server backup system according to claim 20, wherein the information packet further comprises a plurality of aggregated data elements from a call attribute table.

23. (Previously Presented)   A server backup system according to claim 22, wherein the plurality of aggregated data elements of the information packet are separated by said parser for reconstructing the call information from said information packet.

24. (Previously Presented)   A server backup system according to claim 20, wherein the server is a resource pool manager server (RPMS).

25. (Canceled)

26. (Previously Presented)   A server backup system according to claim 20, further comprising:

a failure detector associated with the NAS, for detecting the failure of the server.

27-29. (Canceled)

30. (Currently Amended)   A server backup system for maintaining an ongoing call placed by a call-in user to a network, the network and a failure detector connected to the network for determining whether said server access failure has occurred, said memory and said failure detector both associated with a network access server (NAS) that is connected to said network, said system comprising:

Appl. No. 09/452,285
Amdt. dated: January 6, 2004
Reply to Office Action of October 6, 2003

Docket No. CISCO-1515
(032590-000083)

a first server connected to the network for servicing the call;

a second server connected to the network for servicing the call if the first server

fails; and

a network access server (NAS) for coupling the call from the user to said first

server, and coupling the call to said second server if the first server fails, said NAS

including a memory associated therewith,

wherein said first server comprising:

an encoder for generating an information packet <u>associated with an</u>

<u>ongoing call placed the call-in user via the NAS</u>, the information packet containing call

information for maintaining connection of the <u>ongoing</u> call <u>if the first server fails</u>; and

a sender for transmitting the information packet from said encoder to the

memory associated with the NAS, the memory storing the information packet,

and wherein said second server comprising:

an information packet requester for requesting the information packet

from the memory in response to the call received from the NAS, if the call

information is not available to the second server; and

a parser for reconstructing the call information from the information

packet.

31. (Previously Presented)   A server backup system according to claim 30, wherein

said NAS further comprises:

a failure detector for detecting the failure of said second server.

Appl. No. 09/452,285
Amdt. dated: January 6, 2004
Reply to Office Action of October 6, 2003

Docket No. CISCO-1515
(032590-000083)

32. (Previously Presented)   A server backup system according to claim 30, wherein said first server is a resource pool manager server (RPMS) and said second server is a backup RPMS.

33-51. (Canceled)

52. (Previously Presented)   A NAS according to claim 17, wherein said sender transmits the information packet in response to a request from the backup server.

53-62. (Canceled)

63. (Currently Amended)   A method performed by a backup server for enabling a data communications network to recover from a local server failure, the data communications network including a network access server (NAS) for coupling a call placed from a call-in user to the data communications network, the NAS having a memory associated therewith, said method comprising:

receiving an information packet from the memory associated with the NAS in response to the local server failure, the information packet being associated with an ongoing call placed by the call-in user via the NAS, the information packet containing call information for maintaining connection of the ongoing call if the local server fails; and

reconstructing the call information from the information packet so as to maintain the ongoing call to the data communications network.

Appl. No. 09/452,285
Amdt. dated: January 6, 2004
Reply to Office Action of October 6, 2003

Docket No. CISCO-1515
(032590-000083)

64. (Previously Presented)   A method according to claim 63, wherein the call

information comprises server-state attribute (SSA) data having an attribute/value pair,

said reconstructing comprising:

> parsing the SSA data into a plurality of separate data entries.

65. (Previously Presented)   A method according to claim 64, further comprising:

> petitioning to the NAS for the information packet after the NAS requests the call

information; and

> sending the call information to the NAS after completing said reconstructing.

66. (Currently Amended)   A method performed by a local server for enabling a data

communications network to recover from a failure of said local sever, the data

communications network including a backup server and a network access server (NAS),

the NAS coupling a call placed from a call-in user to the data communications network,

the NAS having a memory associated therewith, said method comprising:

> generating an information packet associated with an ongoing call <u>placed by the</u>

<u>call-in user via the NAS</u>, the information packet containing call information for

maintaining connection of the ongoing call if the local server fails; and

> transmitting the information packet to the memory associated with the NAS, the

information packet being stored in the memory to be available to the backup server if the

local server fails.

Appl. No. 09/452,285
Amdt. dated: January 6, 2004
Reply to Office Action of October 6, 2003

Docket No. CISCO-1515
(032590-000083)

67. (Previously Presented)   A method according to claim 66, wherein the call

information comprises server-state attribute (SSA) data having an attribute/value pair,

said method further comprising:

encoding a plurality of aggregated data elements from a call attribute table

representing the SSA data; and

delimiting information packet into an attribute data string and a value data string.

68. (Currently Amended)   A method for maintaining a call placed by a call-in user to

a data communications network, the network including a network access server (NAS)

for coupling the call to the network, a memory associated to the NAS, a local server

servicing the call, a backup server, and a failure detector for detecting a failure of the

local server, the method comprising:

generating an information packet associated with an ongoing call placed by the

call-in user via the NAS, wherein the information packet containing call information of

an ongoing call for maintaining connection of the call if the local server fails;

transmitting the information packet to the memory associated with the NAS, the

information packet being stored in the memory;

coupling the call to the local server if the local server does not fail, and for

coupling the call to the backup server if the local server fails;

transmitting the information packet from the memory associated with NAS to the

backup server if the local server fails; and

reconstructing the call information from the information packet such that the

backup server can recover the call context and serve the ongoing call without

disconnecting the user from the network.

Appl. No. 09/452,285
Amdt. dated: January 6, 2004
Reply to Office Action of October 6, 2003

Docket No. CISCO-1515
(032590-000083)

69. (Currently Amended)   A method performed by a network access server (NAS) for

maintaining a call placed from a call-in user to a data communications network, the data

communications network including a local server for servicing the call, and a backup

server capable of servicing the call, said method comprising:

receiving an information packet from the local server, the information packet

associated with an ongoing call placed by the call-in user via the NAS, the information

packet containing call information of the an ongoing call for maintaining connection of

the ongoing call if the local server fails;

storing the information packet in a memory associated with the NAS;

determining if a failure of the local server has occurred; and

transmitting the information packet from the associated memory to the backup

server if the local server failure has occurred.

70. (Previously Presented)   A method according to claim 69, wherein the call

information comprises server-state attribute (SSA) data having an attribute/value pair that

can be parsed into a plurality of separate data entries.

71. (Currently Amended)   A program storage device readable by a machine, tangibly

embodying a program of instructions executable by the machine to perform a method to

be performed at a backup server for enabling a data communications network to recover

from a local server failure, the data communications network including a network access

server (NAS) for coupling a call placed from a call-in user to the data communications

network, the NAS having a memory associated therewith, said method comprising:

Appl. No. 09/452,285
Amdt. dated: January 6, 2004
Reply to Office Action of October 6, 2003

Docket No. CISCO-1515
(032590-000083)

receiving an information packet from the memory associated with the NAS in

response to the local server failure, the information packet being associated with an

ongoing call placed by the call-in user via the NAS, the information packet containing

call information for maintaining connection of the ongoing call if the local server fails;

and

reconstructing the call information from the information packet so as to maintain

the ongoing call to the data communications network.

72. (Previously Presented)   A program storage device according to claim 71, wherein

the call information comprises server-state attribute (SSA) data having an attribute/value

pair, said reconstructing comprising:

parsing the SSA data into a plurality of separate data entries.

73. (Previously Presented)   A program storage device according to claim 72, further

comprising:

petitioning to the NAS for the information packet after the NAS requests the call

information; and

sending the call information to the NAS after completing said reconstructing.

74. (Currently Amended)   A program storage device readable by a machine, tangibly

embodying a program of instructions executable by the machine to perform a method to

be performed at a local server for enabling a data communications network to recover

from a failure of said local sever, the data communications network including a backup

server and a network access server (NAS), the NAS coupling a call placed from a call-in

Appl. No. 09/452,285
Amdt. dated: January 6, 2004
Reply to Office Action of October 6, 2003

Docket No. CISCO-1515
(032590-000083)

user to the data communications network, the NAS having a memory associated

therewith, said method comprising:

generating an information packet associated with an ongoing call placed by the

call-in user via the NAS, the information packet containing call information for

maintaining connection of the ongoing call if the local server fails; and

transmitting the information packet to the memory associated with the NAS, the

information packet being stored in the memory to be available to the backup server if the

local server fails.

75. (Previously Presented)   A program storage device according to claim 74, wherein

the call information comprises server-state attribute (SSA) data having an attribute/value

pair, said method further comprising:

encoding a plurality of aggregated data elements from a call attribute table

representing the SSA data; and

delimiting information packet into an attribute data string and a value data string.

76. (Currently Amended)   A program storage device readable by a machine, tangibly

embodying a program of instructions executable by the machine to perform a method to

be performed at a network access server (NAS) for maintaining a call placed from a call-

in user to a data communications network, the data communications network including a

local server for servicing the call, and a backup server capable of servicing the call, said

method comprising:

receiving an information packet from the local server, the information packet

associated with an ongoing call placed by the call-in user via the NAS, the information

Appl. No. 09/452,285
Amdt. dated: January 6, 2004
Reply to Office Action of October 6, 2003

Docket No. CISCO-1515
(032590-000083)

packet containing call information of an ongoing call for maintaining connection of the

ongoing call if the local server fails;

storing the information packet in a memory associated with the NAS;

determining if a failure of the local server has occurred; and

transmitting the information packet from the associated memory to the backup

server if the local server failure has occurred.

77. (Previously Presented)   A program storage device according to claim 76, wherein

the call information comprises server-state attribute (SSA) data having an attribute/value

pair that can be parsed into a plurality of separate data entries.

78. (Currently Amended)   An apparatus for enabling a data communications network

to recover from a local server failure, the data communications network including a

network access server (NAS) for coupling a call placed from a call-in user to the data

communications network, the NAS having a memory associated therewith, said apparatus

comprising:

means for receiving an information packet from the memory associated with the

NAS in response to the local server failure, the information packet being associated with

an ongoing call placed by the call-in user via the NAS, the information packet containing

call information for maintaining connection of the ongoing call if the local server fails;

and

means for reconstructing the call information from the information packet so as to

maintain the ongoing call to the data communications network.

17

Appl. No. 09/452,285
Amdt. dated: January 6, 2004
Reply to Office Action of October 6, 2003

Docket No. CISCO-1515
(032590-000083)

79. (Previously Presented)   An apparatus according to claim 78, wherein the call

information comprises server-state attribute (SSA) data having an attribute/value pair,

said means for reconstructing comprising:

means for parsing the SSA data into a plurality of separate data entries.

80. (Previously Presented)   An apparatus according to claim 79, further comprising:

means for petitioning to the NAS for the information packet after the NAS

requests the call information; and

means for sending the call information to the NAS after completing said

reconstructing.

81. (Currently Amended)   An apparatus for enabling a data communications network

to recover from a failure of said local sever, the data communications network including

a backup server and a network access server (NAS), the NAS coupling a call placed from

a call-in user to the data communications network, the NAS having a memory associated

therewith, said apparatus comprising:

means for generating an information packet associated with an ongoing call

placed by the call-in user via the NAS, the information packet containing call information

for maintaining connection of the ongoing call if the local server fails; and

means for transmitting the information packet to the memory associated with the

NAS, the information packet being stored in the memory to be available to the backup

server if the local server fails.

Appl. No. 09/452,285
Amdt. dated: January 6, 2004
Reply to Office Action of October 6, 2003

Docket No. CISCO-1515
(032590-000083)

82. (Previously Presented)   An apparatus according to claim 81, wherein the call

information comprises server-state attribute (SSA) data having an attribute/value pair,

said apparatus further comprising:

means for encoding a plurality of aggregated data elements from a call attribute

table representing the SSA data; and

means for delimiting information packet into an attribute data string and a value
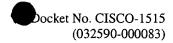
data string.

83. (Currently Amended)   An apparatus for maintaining a call placed from a call-in

user to a data communications network, the data communications network including a

local server for servicing the call, and a backup server capable of servicing the call, said

apparatus comprising:

means for receiving an information packet from the local server, the information

packet associated with an ongoing call placed by the call-in user via said apparatus, the

information packet containing call information of the an ongoing call for maintaining

connection of the ongoing call if the local server fails;

means for storing the information packet in a memory associated with said

apparatus;

means for determining if a failure of the local server has occurred; and

means for transmitting the information packet from the associated memory to the

backup server if the local server failure has occurred.

19

Appl. No. 09/452,285
Amdt. dated: January 6, 2004
Reply to Office Action of October 6, 2003

Docket No. CISCO-1515
(032590-000083)

84. (Previously Presented)   An apparatus according to claim 83, wherein the call information comprises server-state attribute (SSA) data having an attribute/value pair that can be parsed into a plurality of separate data entries.

85. (New)   A backup server according to claim 1, wherein the call information comprises at least one of:

Dialed Number Information Service (DNIS) address;

call type;

Calling Line Identification (CLID); and

service accounting information.

86. (New)   A backup server according to claim 1, wherein the call information comprises at least one of:

Dialed Number Information Service (DNIS) address;

call type;

Calling Line Identification (CLID); and

service accounting information.

87. (New)   A local server according to claim 9, wherein the call information comprises at least one of:

Dialed Number Information Service (DNIS) address;

call type;

Calling Line Identification (CLID); and

service accounting information.

Appl. No. 09/452,285
Amdt. dated: January 6, 2004
Reply to Office Action of October 6, 2003

Docket No. CISCO-1515
(032590-000083)

88. (New)   A system according to claim 13, wherein the call information comprises at least one of:

    Dialed Number Information Service (DNIS) address;

    call type;

    Calling Line Identification (CLID); and

    service accounting information.

89. (New)   A NAS according to claim 17, wherein the call information comprises at least one of:

    Dialed Number Information Service (DNIS) address;

    call type;

    Calling Line Identification (CLID); and

    service accounting information.

90. (New)   A server backup system according to claim 20, wherein the call information comprises at least one of:

    Dialed Number Information Service (DNIS) address;

    call type;

    Calling Line Identification (CLID); and

    service accounting information.

91. (New)   A server backup system according to claim 30, wherein the call information comprises at least one of:

    Dialed Number Information Service (DNIS) address;

Appl. No. 09/452,285
Amdt. dated: January 6, 2004
Reply to Office Action of October 6, 2003

Docket No. CISCO-1515
(032590-000083)

call type;

Calling Line Identification (CLID); and

service accounting information.